PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P6214PC00/MLO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE 2004/000641	International filing date *(day/month/year)* 28-04-2004	Priority date *(day/month/year)* 30-04-2003
International Patent Classification (IPC) or national classification and IPC H02J 7/00		
Applicant Creator Teknisk Utveckling et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
29-11-2004	31-01-2004
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2004/000641

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-14 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 15-17 received by this Authority on 29-11-2004
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1/6-6/6 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2004/000641

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-10	YES
	Claims		NO
Inventive step (IS)	Claims	1-10	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Document cited in the International Search Report:
D: US 5592068 A

Document D discloses a battery rejuvenator. A plurality of consecutive voltage bursts are applied to the battery (col. 1, lines 41-50), thus lowering the internal resistance of the battery. Thereafter, a charging cycle may be initiated (col. 3, lines 37-43). Contents of the amended claim 1 in the International Application differ from document D in that it is stated that there is a step of detecting the voltage over the connected battery to sense an increase of voltage over said battery in order to identify whether the internal resistance of the battery has increased compared to a normal state. Moreover, claim 1 in the International Application states that each voltage burst has a length of at least an order of mS, whereas document D discloses a substantially shorter pulse-length. As opposed to document D, claim 1 defines a method which identifies the need for rejuvenation of the battery. Also the method for rejuvenation defined in claim 1 is deemed to be more efficient than the method according to D.

In the International Search Report, no prior art is cited against the independent claim 5.

To conclude, the invention defined in the claims is novel and is deemed to involve an inventive step. The invention is industrially applicable.

NEW CLAIMS

1. Method of charging a battery at a battery charger comprising connection means for connection to the terminals of a battery to be charged, means for detecting a voltage over the terminals of a connected battery, and control means for initiating a burst cycle, c h a r a c t e r i s e d in that it comprises the steps of:

applying a voltage at a connected battery;

detecting the voltage over the connected battery to sense an increase of voltage over said battery in order to identify whether the internal resistance of the battery has increased compared to a normal state;

initiating a burst cycle if said internal resistance is identified as increased, wherein a plurality of consecutive voltage bursts are applied to a connected battery to be charged, each burst having a length of at least an order of mS and each burst delivering an amount of charge to the battery and thereby successively lowering the internal resistance of the battery; and

initiating a charging cycle to charge the connected battery when said burst cycle has been terminated.

2. Method according to claim 1, wherein each burst has a length within a range from about 50 mS to several seconds.

3. Method according to claim 1 or 2, wherein the step of initiating a burst cycle further comprises the steps of:

applying a voltage burst to the battery when said voltage over the battery has reached a first predetermined level

disconnecting said voltage burst when said voltage over the battery has reached a second predetermined level;

re-applying said voltage burst to the battery when said voltage over the battery has reached the first predetermined level.

4. Method according to claim 1 or 2, wherein the step of initiating a burst cycle comprise the step of:

applying said voltage bursts with a predetermined offset time between two consecutive bursts.

5. Method of maintenance charging a battery at a battery charger comprising connection means for connection to the terminals of a battery to be charged, means for detecting a voltage over a connected battery, and control means, c h a r a c t e r i s e d in that it comprises the steps of:

detecting a voltage over the connected battery;

maintaining the voltage over the battery at a predetermined level for a predetermined period of time;

monitoring a battery capacity parameter when said predetermined period of time has elapsed; and

applying at least one voltage pulse if said parameter falls below a predetermined threshold level.

6. Method according to claim 5, wherein said predetermined capacity parameter is the voltage over the connected battery.

7. Method according to claim 5 or 6 , wherein the step of applying comprises the step of:

applying voltage pulses until the voltage over the battery has reached at least said predetermined level.

8. Method according to claim 5-7,wherein the step of applying comprises the step of:

applying voltage pulses during a predetermined period of time.

9. Computer readable medium comprising instructions for bringing a computer to perform a method according to any one of preceding claims.

10. A battery charger comprising connection means connected to the output lines of the charger, connection means for connection to the terminals of a battery to be charged, means for detecting a voltage over a connected battery, and control means, c h a r a c t e r i z e d in that said control means is connected to said means for detecting and being

arranged to execute the methods according to any one of claims 1-8.